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Gill Jennings & Every, 53-64 Chancery Lane  
London WC2A 1HN(GB)(54) **Method for producing laminated film.**

(57) A method for producing a laminated film includes the steps of preparing a plurality of plastic films for lamination, forming intermittently arranged slits in at least one of the plastic films, and laminating the plurality of the plastic films with one another. The slits extend in running direction of the plastic film, and unslitted portions are provided between the neighboring slits at a predetermined interval.

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The present invention relates to a method for producing a laminated film used for making an easily openable pouch.

In a conventional laminated film material used as a material of an easily openable pouch, in manufacturing the laminated film, a slit extending in a feeding direction of a plastic film is formed. When producing the pouch, the slit is positioned at an opening line position of a resultant pouch. Thus, known is the pouch cuttable along the slit to thereby easily open the pouch.

According to the laminated film for the easily openable pouch of this kind, the slit extending in the feeding direction is formed in at least one of the plastic films of the laminated film, and the plurality of plastic films are laminated with one another for providing the laminated film.

In making the laminated film, the plastic film formed with the slit extending in the feeding direction and another unslitted plastic film(s) are laminated with each other. In this lamination step, surface tension is applied to the plastic films so as to avoid generation of wrinkle on the plastic films. The surface tension is applied in the feeding direction of the plastic films as well as in the lateral direction thereof by means of an expander roller. Therefore, the slit formed in the plastic film may be pulledly opened in the lateral direction. If the slit is excessively opened and such plastic film is wound over a roll, adhesive material may be bulged through the open gap of the stretched slit, to thereby degrade external appearance of a resultant laminated film. Further, blocking may occur. That is, the adhesive material leaked through the slitted opening may be adhered to a newly wound laminated film.

On the other hand, if the slit is excessively narrow and confronting edgelines of the slit are overlapped with each other, stepped portions may be provided at the resultant laminated film. The stepped portion may provide a partly protruded portion when such laminated film are wound over a roll. This protruded portion may provide displacement of the laminated film when it is taken up by the roll, or the rolled laminated film may be partly torn by the protruded portion.

The present invention has been made in view of the above described drawbacks, and it is an object of the present invention to provide a method for producing a laminated film capable of positioning the slit formed in the plastic film at a given stable position during the lamination process, to thereby overcome the above-described problems.

According to the present invention, there is provided a method for producing a laminated film comprising the steps of, preparing a plurality of plastic films for lamination; forming intermittently arrayed slits in at least one of the plastic films, the slits extending in running direction of the plastic

film and unslitted portions being provided between the neighboring slits at a predetermined interval; and laminating the plurality of the plastic films with one another.

In the accompanying drawings:

Fig. 1 is a view for description of a method for producing a laminated film according to the present invention;

Fig. 2 is a view showing slits formed in the plastic film; and

Fig. 3 shows an easily openable pouch produced by the laminated film according to the present invention.

A method for producing a laminated film according to one embodiment of the present invention will be described with reference to drawings.

In Fig. 1, a roll 1 of a plastic film 2, and a roll 3 of a plastic film 4 are provided. The roll 3 is positioned in front of the roll 1 in running direction of the plastic films. In front of the roll 3 with respect to the feeding direction, a cutter device 5 is disposed.

The numbers of the cutter devices 5 correspond to the numbers of the easily openable pouches to be produced, and are positioned spaced away from one another in a transverse direction of the roll 3. Each of the cutter device 5 has two cutters spaced away from each other by about 2 mm. By vertically moving the two cutters, intermittent slits 7 extending in the feeding direction are formed in the plastic film 4, the intermittent slits 7 being spaced away from each other by unslitted portion 6 which are positioned at a predetermined interval.

The length ratio of the slit 7 and the unslitted portion 6 is determined for compliance with the easily openable pouch. For example, if the slit length is in a range of from 100 mm to 200 mm, the unslitted length is in the range of 0.1 mm to 0.5 mm. The length of the unslitted portion 6 should be extremely small in comparison with the slit length. However, if the unslitted length is too small, the unslitted portion may be cut due to the tension applied to the plastic film for the purpose of wrinkle elimination during the lamination step, and therefore, the slit may be largely opened. Therefore, the unslitted portion should provide sufficient length capable of providing a sufficient strength in order to avoid the opening of the slit.

More specifically, if a width of a resultant pouch is intended to be about 100 mm, the slit length should be about 100 mm, so as to exclude the two unslitted portion in the resultant pouch. No or at least one unslitted portion should exist in the resultant pouch. In other words, if the slit length is less than 100 mm, two unslitted portion may exist in the resultant pouch, which may be undesirable for easily opening the resultant pouch. On the other

hand, if the slit length is more than 200 mm, the slit portion may be inadvertently opened during tension application step in order to eliminate the wrinkle of the laminated sheet. Further, if the length of the unslitted portion is less than 0.1 mm, the unslitted portion may be cut during the tension application step or lamination step due to the shortage of the strength. On the other hand, if the length of the unslitted portion is more than 0.5 mm, it would be difficult to linearly align the slit portions with each other.

In making the laminated film by the two plastic films 2 and 4 so as to produce the easily openable pouch, firstly, the rolls 1 and 3 which roll the plastic films 2 and 4 are prepared. Then, one of the plastic films 4 of the one of the rolls 3 is subjected to slit formation so as to form the intermittent slits 7 extending in the feeding direction with the unslitted portions 6 between the intermittent slits at predetermined interval by means of the cutter device 5 positioned in front of the roll 3 with respect to the feeding direction. The plastic film 4 formed with the intermittent slits 7 is laminated with the plastic film 2 supplied from the roll 1 through an adhesive agent a.

In the laminated film, the thus provided unslitted portions 6 can withstand tension applied to the plastic film for wrinkle elimination at the time of the lamination process, and the unslitted portion can avoid opening of the slit.

The easily openable pouch produced by the above described laminated film is shown in Fig. 3. The easily openable pouch 8 includes multi-layer films containing the above described laminated film. In this case, a notch 10 (triangular notch 10 is shown in the illustrated embodiment) is formed at a side heat seal portion 9 of the easily openable pouch 8. A tip portion of the notch 10 is aligned with the slit 7. Alternatively, the notch 10 is positioned slightly lower than the slit 7 as shown in Fig. 3 for facilitating the opening of the pouch. That is, when opening the pouch, a user grips the upper marginal portion of the resultant pouch, and pulls the upper marginal portion upwardly. Therefore, the upward tearing can easily reach the slit portion 7 positioned immediately above the tip end portion of the notch 10, and thereafter, the tearing can be made along the slit 7.

Incidentally, in the above described embodiment, two arrays of the slits are formed on the plastic film. However, a single array or not less than two arrays of slits can be formed. In case of the two array arrangement, the positions of the unslit portions 6, 6 are preferably offset from each other. The offset arrangement is advantageous in minimizing the opening of the slit portions during the laminated film manufacture.

Incidentally, in the above described embodi-

ment, two plastic films are used for the laminated film. However, not less than two plastic films can be used for the laminated film. In this case, the plastic film formed with the slits is preferably positioned in an intermediate layer. For example, the laminated film includes a biaxially oriented polyester film having a thickness of about 12 micron meters, a biaxially oriented nylon film having a thickness of 15 micron meters and formed on the polyester film, an aluminum foil having a thickness of 7 micron meters formed on the nylon film, and non-oriented polypropylene having a thickness of 70 micron meters formed on the aluminum foil. Neighboring films are joined with each other by adhesive materials (DL). In this case, the nylon film undergoes slitting process.

As described above according to the present invention, at least one of the plastic films of the plurality of the plastic films is formed with slits extending in the feeding direction with unslitted portion therebetween at predetermined interval, and the plurality of the plastic films are laminated with one another. Therefore, the slits on the plastic film can provide a predetermined space in lateral direction thereof even if the plastic film is meanderingly fed during the lamination process. Further, at the time of the lamination, the slit is not opened due to the tension applied to the plastic film for the purpose of wrinkle elimination.

### Claims

1. A method for producing a laminated film including the steps of preparing a plurality of plastic films for lamination, and laminating the plurality of plastic films with one another to provide the laminated film, characterized by the steps of:

prior to the laminating step, forming intermittently arranged slits in at least one of the plastic films, the slits extending in running direction of the plastic film and unslitted portions being provided between the neighboring slits at predetermined interval.

2. The method as claimed in claim 1, wherein a length of each of the unslitted portion is in a range of from 0.1 to 0.5 mm.
3. The method as claimed in claim 1, wherein a length of each of the slits is in a range of from 100 to 200 mm.
4. The method as claimed in claim 3, wherein a length of each of the unslitted portion is in a range of from 0.1 to 0.5 mm.
5. The method as claimed in claim 1, wherein a

plurality of arrays of intermittently arranged slits are formed side by side.

6. The method as claimed in claim 5, wherein  
unslitted portion of one of the plurality of ar- 5  
rays of the intermittently arranged slits is posi-  
tioned offset from unslitted portion of remain-  
ing one of the plurality of arrays of the intermit-  
tently arranged slits. 10
7. The method as claimed in claim 2, wherein a  
plurality of arrays of intermittently arranged  
slits are formed side by side. 15
8. The method as claimed in claim 7, wherein 20  
unslitted portion of one of the plurality of ar-  
rays of the intermittently arranged slits is posi-  
tioned offset from unslitted portion of remain-  
ing one of the plurality of arrays of the intermit-  
tently arranged slits. 25
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- 40
- 45
- 50
- 55

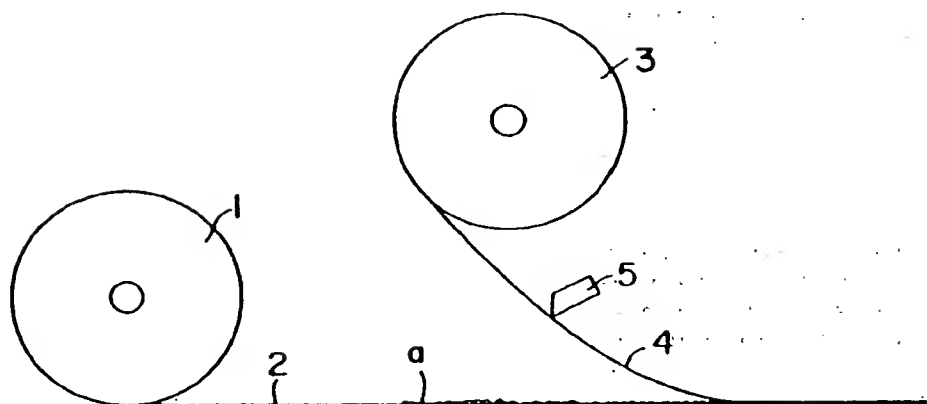


FIG. 1

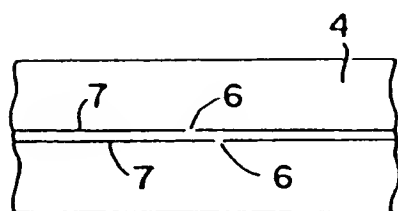


FIG. 2

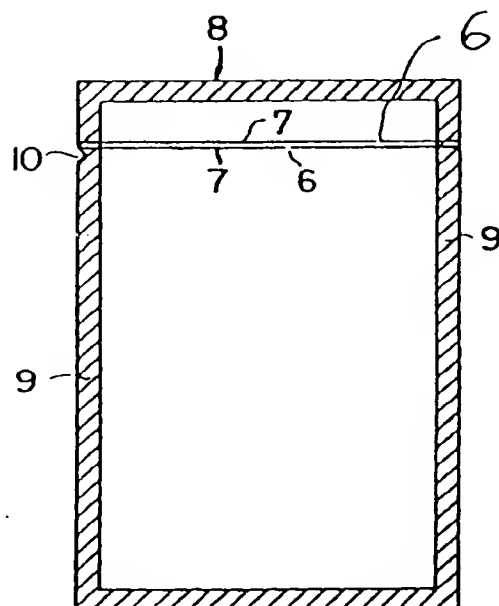


FIG. 3

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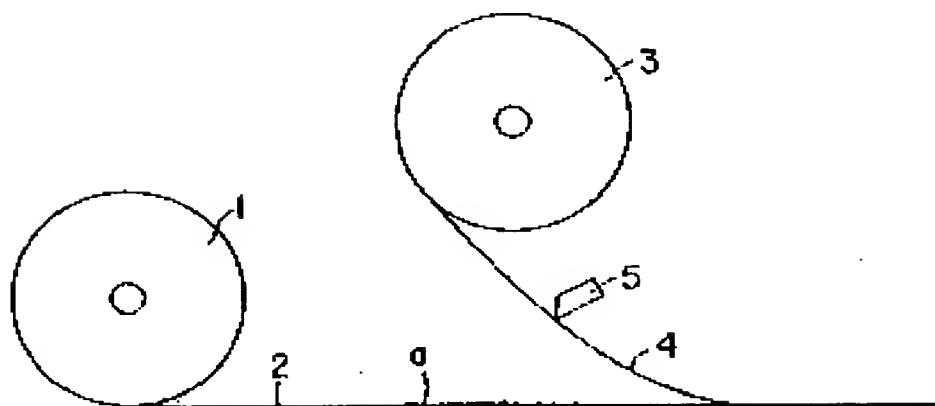


FIG. 1

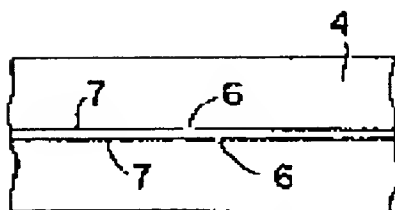


FIG. 2

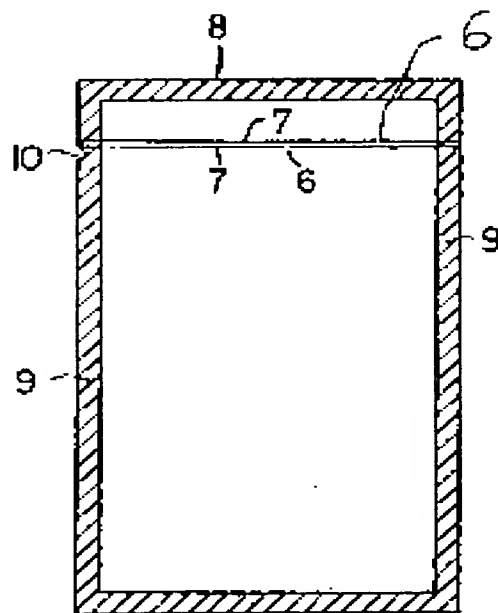


FIG. 3

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**DE DK FR GB IT**(88) Date of deferred publication of the search report:  
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Gill Jennings & Every, 53-64 Chancery Lane  
London WC2A 1HN(GB)**(54) **Method for producing laminated film.**

(57) A method for producing a laminated film includes the steps of preparing a plurality of plastic films (2,4) for lamination, forming intermittently arranged slits (7) in at least one of the plastic films, and laminating the plurality of the plastic films with one another. The slits extend in running direction of the plastic film, and unslitted portions (6) are provided between the neighboring slits at a predetermined interval.

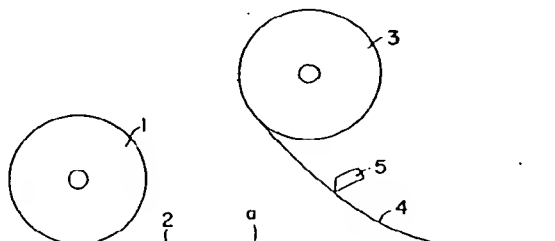


FIG. 1

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## EUROPEAN SEARCH REPORT

Application Number

EP 91 30 3890

### DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	GB-A-2 157 652 (ROEDER INDUSTRIAL HOLDINGS) * page 1, line 49 - line 52 * * page 1, line 128 - page 2, line 13; claim 3; figure 1G *	1	B65D75/58 B32B31/18
X	FR-A-2 349 507 (V JANOWSKI) * page 2, line 15 - line 27 * * page 4, line 20 - line 28 *	1, 5, 7	
Y	* page 5, line 3 - line 13; figure 2 *	6, 8	
Y	US-A-4 737 393 (J A LINKOUS) * claim 1; figure 1 *	6, 8	
A	EP-A-D 363 540 (KABUSHIKI KAISHA HOSOKAWA YOKO) * the whole document *	1, 5-8	
A	GB-A-1 185 026 (MOLINS MACHINE) * page 2, line 88 - line 106 *	1, 5-8	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65D B32B
Place of search THE HAGUE		Date of completion of the search 10 MARCH 1992	Examiner PHILPOTT G. R.
<b>CATEGORY OF CITED DOCUMENTS</b>			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons * : member of the same patent family, corresponding document			

EP 91 30 3890 (P.0001)